UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,018	02/20/2004	Christoph Gurtler	PO-7979/LeA 36,396	2512

157 7590 04/28/2010

BAYER MATERIAL SCIENCE LLC
100 BAYER ROAD
PITTSBURGH, PA 15205

EXAMINER	
GILLESPIE, BENJAMIN	

ART UNIT	PAPER NUMBER
1796	

NOTIFICATION DATE	DELIVERY MODE
04/28/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

veronica.thompson@bayerbms.com
bmspatents@bayerbms.com
donna.veatch@bayerbms.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CHRISTOPH GURTLER, JAN MAZANEK,
JOACHIM PETZOLDT, HEINZ SCHMIDT,
and STEPHAN NOWAK

Appeal 2009-010133
Application 10/784,018
Technology Center 1700

Decided: April 26, 2010

Before MICHAEL P. COLAIANNI, BEVERLY A. FRANKLIN, and KAREN M. HASTINGS, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1, 3, 5 through 8, 14 through 18, 22 through 24, and 29 through 37. We have jurisdiction pursuant to 35 U.S.C. § 6.

We AFFIRM.

STATEMENT OF THE CASE

The subject matter on appeal is directed to a polyurethane-based one component baking system. Claim 1 is illustrative:

> 1. Polyurethane-based one-component baking systems comprising
> (a) blocked polyisocyanates,
> (b) polymers having isocyanate-reactive groups,
> (c) one or more organic and/or inorganic compounds of molybdenum and/or of tungsten in which the molybdenum and/or tungsten has an oxidation state of at least + 4 and which comprise a member selected from the group consisting of ammonium molybdate, lithium molybdate, sodium molybdate, potassium molybdate, rubidium molybdate, caesium molybdate, ammonium paramolybdate $(NH_4)_6Mo_7O_{24} \cdot 4\ H_2O$, molybdenyl bisacetylacetonate $MoO_2(C_5H_7O_5)_2$, molybdenum dioxide tetramethylheptadionate $MoO_2(TMHD)_2$, molybdenum alkoxides formed from 1,2-, 1,3- or 1,4-diols such as ethylene glycol, propylene glycol or 1,4-butanediol-molybdic acid, molybdenum oxides, tetraethylammonium molybdate, sodium tungstate, magnesium molybdate, lithium tungstate and phosphotungstic acid,
> (d) water and/or organic solvents or solvent mixtures and
> (e) optionally further additives and auxiliaries,
>
> wherein the amounts of (a) + (b) are from 20 to 89.9 parts by weight, (c) is from 0.01 to 5 parts by weight, (d) is from 10 to 70 parts by weight and (e) is from 0 to 10 parts by weight and the sum of the parts by weight of components (a) to (e) is 100.

As evidence of unpatentability of the claimed subject matter, the Examiner relies upon the following references:

Yagii	5,138,015	Aug. 11, 1992
Watanabe	US 2003/0096103 AL	May 22, 2003

The Examiner maintains the rejection of claims 1-3, 5-8, 14-18, 22-24, and 29-37 under 35 U.S.C. § 103(a) as unpatentable over Watanabe and Yagii.

Appellants argue the claims as a group. Accordingly, we select claim 1 as representative with the remaining claims standing or falling therewith. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ISSUE

Did the Examiner reversibly err in determining that it would have been obvious to employ Yagii's molybdenum oxide catalyst as Watanabe's molybdenum oxide catalyst to deblock its diisocyanates during the process to form polyurethane? We decide this issue in the negative.

FINDINGS OF FACT

1. Appellants do not specifically dispute the Examiner's finding that

> Watanabe et al teach a coated metal plate and method for its production, wherein the coating comprises a one-component polyurethane based baking system comprising a mixture of blocked polyisocyanate, polymers having isocyanate-reactive groups, Molybdenum oxide catalyst, water, and further additives and auxiliaries, wherein all components are present in amounts that correspond to the claimed ranges (Abstract, paragraphs 30, 31, 32, 36, 37, and 53). In particular, the blocked polyisocyanate consists of hexamethylene and isophorone diisocyanate, and the isocyanate-reactive polymers consist of polyesters (Paragraphs 30 and 33).
>
> . . . .
>
> Various methods of mixing are disclosed by Watanabe et al; the first being catalyst added to blocked polyisocyanate and isocyanate-reactive polymer mixture prior to being dispersed in water, and another being blocked polyisocyanate, isocyanate-reactive polymer and catalyst are added together in the presence of solvent before dispersion in water (Paragraphs 35-37).

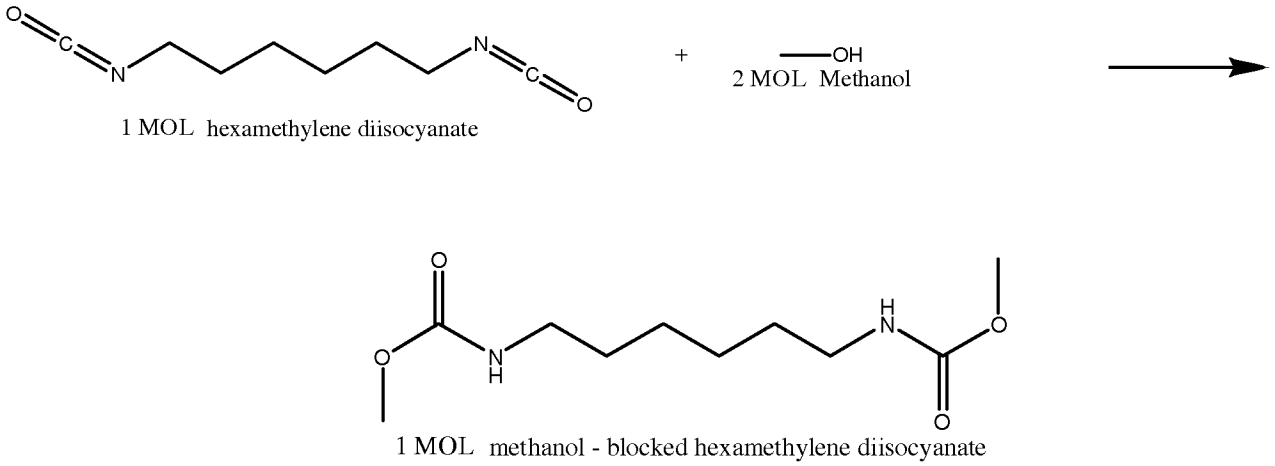
(*Compare* Ans. 4 and 5 *with* App. Br. 4-7 and Reply Br. 2-3).

In this regard, Watanabe teaches a cationic electrodeposition paint comprising polyurethane prepared by, *inter alia*, blending a base resin,

which may include a polyurethane resin having, *inter alia*, a hydroxyl group, with a curing agent such as a blocked polyisocyanate compound. (*See* Watanabe, ¶¶ [0030], [0031], and [0036]). Watanabe teaches that this blocked polyisocyanate compound may be formed by blocking a polyisocyanate compound, which may be hexamethylene diisocyanate, with "known blocking agents of . . . an alcohol base." (Watanabe, ¶¶ [0032]-[0034]).

Watanabe also teaches that this blocked polyisocyanate compound may be heated so that the blocking agent is "dissociated to regenerate the isocyanate groups . . . [so that they can] take part in a cross linking reaction with a base resin." (Watanabe, ¶ [0032]). In addition, Watanabe teaches that the cationic electrodeposition paint can be compounded with a "curing catalyst having a corrosion resistance such as . . . oxides . . . of metals selected from, for example . . . molybdenum." (Watanabe, ¶ [0037]). Watanabe also teaches curing "at 100° to 200°C." (Watanabe, ¶ [0038]).

2. Appellants do not specifically dispute the Examiner's finding that "[t]he blocking . . . chemistry of Watanabe et al [is as follows]:



(*Compare* Ans. 7 *with* App. Br. 4-7 and Reply Br. 2-3).

3. Appellants do not specifically dispute the Examiner's finding that

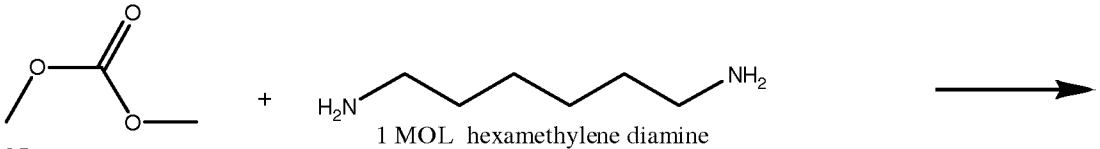
> Yagii et al teach the production of polyurethane, wherein a urethane intermediate is thermally decomposed into diisocyanate and methanol, and the diisocyanate is then reacted with hydroxyl-functional material to produce polyurethane. The thermal decomposition produces diisocyanate consisting of isophorone, hexamethylene, xylene, and toluene diisocyanate, and said decomposition is aided by Molybdenum acetyl-acetonate and Molybdenum oxide catalysts (Abstract; col. 9 lines 1-22, 31-58). It is noted that the intermediate is the reaction product of a dialkyl carbonate and diamine; however, the resulting intermediate structure is identical to that of an alcohol-blocked diisocyanate. Finally, Yagii et al teach the thermal decomposition preferably feeds the urethane composition into catalyst containing solvent (Col 10 lines 49-52).

(*Compare* Ans. 5 *with* App. Br. 4-7 and Reply Br. 2-3).

In this regard, Yagii teaches a polyurethane, which is useful as a coating, formed by the following steps: (1) reacting carbonate and diamine to yield a urethane; (2) thermally decomposing the urethane into a diisocyanate; and (3) reacting the diisocyanate with polyol in an acid to form a polyurethane. (Yagii, col. 1, ll. 5-21). Yagii also teaches that "[t]he catalyst usable in the thermal decomposition includes . . . molybdenum trioxide." (Yagii, col. 9, ll. 45-53).

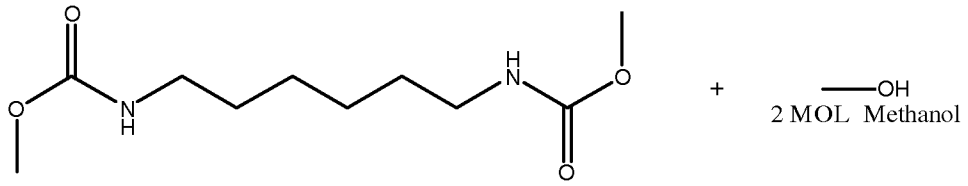
4. Appellants do not specifically dispute the Examiner's finding that the reaction mechanisms of Yagii's steps (1) and (2), which are referenced in Factual Finding 3 above, are as follows:

[*STEP (1): reacting carbonate and diamine to yield a urethane*]



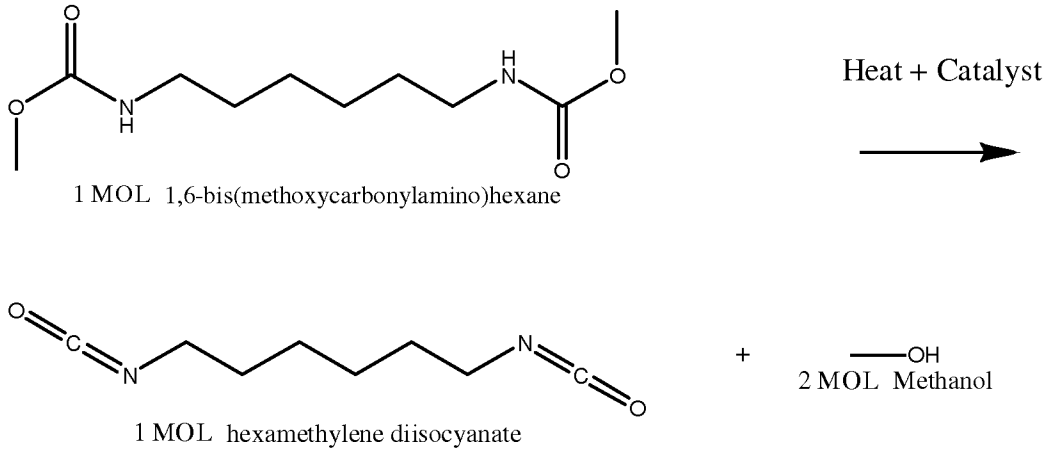
2 MOL dimethyl carbonate

1 MOL hexamethylene diamine



[*STEP (2): thermally decomposing the urethane into a diisocyanate*]

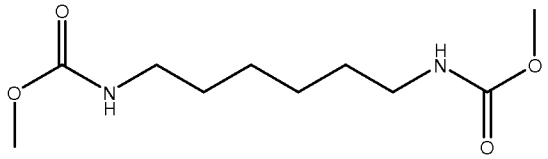
The urethane intermediate consists of 1,6-bis(methoxy-carbonylamino)hexane, which is then thermally decomposed in the presence of the relevant catalyst to form the reactive diisocyanate compounds



This last stage shows that hexamethylene diioscyanate (HDI) and methanol blocking agent are produced, wherein the HDI is then further reacted with hydroxyl-functional material to form the final polyurethane. (*Compare* Ans. 6-7 *with* App. Br. 4-7 and Reply Br. 2-3).

5. Appellants do not specifically dispute the Examiner's finding that

both Yagii . . . and Watanabe . . . creat[e] free diisocyanate from compounds corresponding to the formula:



(*Compare* Ans. 8 *with* App. Br. 4-7 and Reply Br. 2-3).

In this regard, Appellants do not specifically dispute the Examiner's finding that "the urethane intermediate of Yagii et al: 1,6- is (methoxycarbonylamino)-hexane is the same as the methanol-blocked hexamethylene diisocyanate of Watanabe et al." (*Compare* Ans. 8 *with* App. Br. 4-7 and Reply Br. 2-3).

6. Appellants do not specifically dispute the Examiner's reason to combine Watanabe and Yagii. (*Compare* Ans. 5 *with* App. Br. 4-7 and Reply Br. 2-3). In this regard, Appellants do not specifically dispute the Examiner's determination that "it would have been obvious to utilize . . . the Molybdenum oxide catalysts of Yagii et al [to] facilitate de-blocking the same diisocyanates as Watanabe et al, which would thereby facilitate the curing process of Watanabe et al." *Id.*

PRINCIPLES OF LAW

"Many of appellant's arguments fail from the outset because . . . they are not based on limitations appearing in the claims. . . ." *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

"[A]nalysis [of whether the subject matter of a claim would have been obvious] need not seek out precise teachings directed to the specific subject

matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

When assessing whether a claimed invention would have been obvious, a court must ask "whether the improvement is more than the predictable use of prior art elements according to their established functions." *KSR*, 550 U.S. at 417.

A slight overlap between the prior art and claimed ranges establishes a prima facie case of obviousness. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003).

"[O]ne cannot show non-obviousness by attacking references individually where . . . the rejections are based on combinations of references." *In re Keller*, 642 F.2d 413, 425-26 (CCPA 1981).

ANALYSIS AND CONCLUSION

Appellants argue that

> Yagii et al teaches a large number of catalysts which are suitable for use in converting the disclosed diisocyanates to polyurethanes. However, not a single molybdenum or tungsten compound is taught to be suitable for this conversion. This "omission" of tungsten and molybdenum compounds is particularly significant in view of Yagii et al's teaching that molybdenum and tungsten compounds were suitable catalysts for the decomposition of polyurethanes. One skilled in the art reading the teachings of Yagii et al at the time Appellants made their invention would not therefore consider it obvious to use or even obvious to try molybdenum and/or tungsten compounds as a catalyst in the polyurethane-forming reaction mixture.

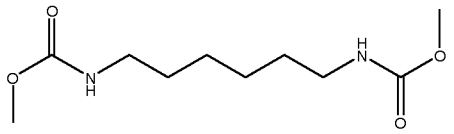
(App. Br. 6). In addition, Appellants argue that

> Yagii et al does not teach or suggest that use of a molybdenum and/or tungsten compound in polyurethane-based one-component baking system would make it possible to cure that baking system at temperatures of from 90 to 160°C.
>
> The teachings of Yagii et al do not therefore "supply" the teachings "missing" from the teachings of Watanabe et al with respect to the molybdenum and/or tungsten compounds required for Appellants' claimed invention.

(App. Br. 6).

Appellants' arguments are unpersuasive of reversible error because Appellants do not specifically dispute the Examiner's findings regarding Watanabe or Yagii or the Examiner's reason for combining Watanabe and Yagii, which is to "utilize . . . the Molybdenum oxide catalysts of Yagii et al [to] facilitate de-blocking the same diisocyanates as Watanabe et al, which would thereby facilitate the curing process of Watanabe et al." (FF 1-6).

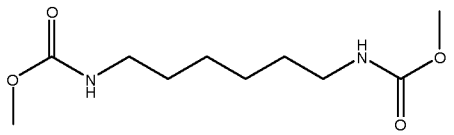
Watanabe teaches polyurethane coatings formed by dissociating a blocked diisocyanate compound via heat and a molybdenum oxide catalyst and then cross linking this isocyanate compound with a base resin. (*See* FF 1). In this regard, Appellants do not specifically dispute the Examiner's finding that Watanabe's blocked diisocyanate compound has the following structure:



(FF 2 and 5). Watanabe, however, is silent regarding the molybdenum's oxidation state of its molybdenum oxide catalyst.

Yagii teaches a polyurethane coating formed by, *inter alia*, decomposing a urethane compound into a diisocyanate via heat and a molybdenum trioxide catalyst, which is known to have an oxidation state of +6. (FF 3).

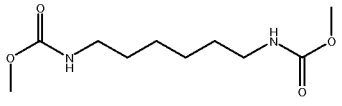
In addition, Appellants do not specifically dispute the Examiner's finding that Yagii's urethane compound is the same as Watanabe's blocked diisocyanate, which has the following structure:



(FF 3-5).

Thus, we agree with the Examiner that "it would have been obvious to utilize . . . the Molybdenum oxide catalysts of Yagii et al [to] facilitate de-blocking the same diisocyanates as Watanabe et al, which would thereby facilitate the curing process of Watanabe et al." and form polyurethane. (FF 6).

Moreover, this modification would have been merely the predictable use of a prior art element according to its established function. Specifically, it would have been obvious to employ Yagii's molybdenum trioxide catalyst catalyst as Watanabe's molybdenum oxide catalyst because such is nothing more than the predictable use of a prior art element (i.e., molybdenum trioxide catalyst) according to its established function (i.e., facilitates decomposing a urethane compound having the structure:

 into a diisocyanate). *KSR*, 550 U.S. at 417.

With respect to Appellants' argument that Yagii does not teach curing at "temperatures of from 90 to 160°C," we note that this feature is not claimed. Thus, Appellants' argument directed to this unclaimed feature is unpersuasive of reversible error. *See In re Self*, 671 F.2d at 1348.

Moreover, we note that contrary to Appellants' argument, Watanabe teaches curing "at 100° to 200°C," which overlaps Appellants' unclaimed temperature of 90 to 160°C, and thus establishes a prima facie case of obviousness. *See Peterson*, 315 F.3d at 1329; *see also* FF 1.

Appellants also argue that "[t]here is no teaching in Watanabe et al of any catalyst within the scope of Appellants' claimed invention." (App. Br. 5). In addition, Appellants argue that

> Yagii et al does not teach or suggest anything with respect to one component baked coating systems. In fact, the teaching for which Yagii et al is cited is directed to the production of an isocyanate, i.e., a process for producing a starting material for the blocked polyisocyanates employed in the coating systems of Applicants' invention - not the coating system of Applicants' claims.

(App. Br. 5). Appellants also argue that "Yagii et al teaches that catalysts such as those required by Appellants' claims are suitable for breaking down a polyurethane rather than forming a polyurethane. Appellants are, however, claiming systems which form a polyurethane." (App. Br. 5).

These arguments by Appellants, however, are directed against the individual teachings of Watanabe and Yagii and fail to address and thus fail to show error in the Examiner's determination that the teachings of Watanabe and Yagii, as a whole, would have suggested the claimed invention.

As explained by the Examiner, Yagii and Watanabe teach that the decomposition of the blocked diisocyanate is but one step in the process of forming polyurethane. (*See* FF 1, 3, and 4). The Examiner explains that the reactive diisocyanate, which is formed by deblocking the blocked diisocyanate in the presence of a catalyst (e.g., molybdenum oxide) and heat, reacts with hydroxyl compounds to form polyurethane. (*See* FF 4). Therefore, the use of Yagii's molybdenum oxide catalyst (e.g., molybdenum trioxide) as part of Watanabe's process to form a polyurethane would have been obvious.

Thus, it follows that the Examiner did not reversibly err in determining that it would have been obvious to employ Yagii's molybdenum oxide catalyst, which may be molybdenum trioxide having a molybdenum oxidation state of +6, as Watanabe's molybdenum oxide catalyst.

ORDER

In summary, the rejection is sustained.

Accordingly, the Examiner's decision is affirmed.

TIME PERIOD

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(2009).

AFFIRMED

cam

BAYER MATERIAL SCIENCE LLC
100 BAYER ROAD
PITTSBURGH PA 15205